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some time in Grace Church, New York. In this system the hammers of the bells are worked from a key-board, like that of a piano, and the largest sized bells can be played as easily and quickly as a piano itself. The mechanism is very simple, the keys making contacts which actuate relays, and these in turn excite solenoids with iron plungers, to which are attached the bell ropes. Instead of the key-board, a small cylinder, like that of a music-box, can be used, which automatically plays the chimes every hour or quarter.

The most valuable part, however, is the electric tower-clock arrangement. In this, instead of the ordinary cumbersome clock-movement requiring frequent rewindings, an ordinary clock is used, which may be placed anywhere, in an office, for instance. Every minute this clock makes a contact, which actuates a little battery motor, and this turns the hands of the tower-clock one minute ahead. As the impulse is given at the middle of the minute, the tower hands are never more than half a minute out of time. The actuating clock may be synchronized from Washington if desired. This system seems to give a very good tower clock for a fraction of the present price. One advantage is the fact that no winding is required, six or seven Leclanche cells furnishing enough current to run the clock for several years.

Another exhibit which will be gladly hailed by those who have had to do much telephoning will be the automatic telephone exchange in the gallery of the electrical building. In this system, the telephones are the same as usual, but in front of the wooden box which supports the transmitter are placed a number of keys. If a subscriber wishes to call up number 1324, for instance, he presses key number 1, once; key number 2, three times; key 3, twice; and key 4, four times. He then presses another key, and if the subscriber he wishes to communicate with is talking to some one else, it signals him that fact; if the line is open, it puts him in communication. When he is through, he presses the key again, and it disconnects him.

Several central offices have been put in, and are working satisfactorily, and a number of other cities have decided to replace their present central office by this automatic system.

At present there is one disadvantage which the system has, i. e., the need of four wires instead of two; but, from an examination of the machines, there seem to be several ways by which two wires could do all the work, and doubtless this improvement will soon be made. Even with the increased expense, the better service will more than compensate for the increased cost in wiring, and, of course, the central station expenses will be much reduced.

A very complete exhibit is that of the Bell Telephone Company. This includes an interesting historical exhibit of the various forms of telephone receivers and transmitters invented by Mr. Bell. A central station is shown at work, the methods of connecting up the lines, etc.

One of the new things is the use of paper insulation for telephone cables. Seemingly impracticable as this seemed to be a few years ago, it is now a complete success. Of course, it is evident that its low specific inductive capacity gives it marked advantages over any other kind of insulation, and that by its use speech could be made clearer, and transmitted further, but it would at first sight appear that it would be difficult to keep up its insulating qualities. This, however, has been done, and nearly every switchboard observed was wired with this insulation. The operation of putting it on the wire is shown in the Electrical Building.

R. A. F.

LETTERS TO THE EDITOR.

* * * Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.

On request in advance, one hundred copies of the number containing his communication will be furnished free to any correspondent.

The editor will be glad to publish any queries consonant with the character of the journal.

Peculiar Nesting of a King-Bird.

A CURIOUS incident, showing a peculiarity of bird-life, came under my notice within the last month (June, 1893). We have been boring an artesian well about five miles south of Beaumont, mound rising out of the great coastal prairie lying

between Beaumont and Sabine Pass, in Jefferson County, Texas, and in the course of the operations have built a derrick about seventy-five feet high. After the derrick had been built a few weeks, it was visited by a great number of birds of various kinds, whether with a view of locating or not, I do not know, but one would think a well outfit, with all its noise and wet, a very unfavorable location for bird-life. Among the visitors came a pair of king-birds (*Tyrannus tyrannus*), which, after an apparently careful inspection, became convinced that they had found a satisfactory location for their home. A sheltered point, where two of the cross-beams came together in a corner of the derrick about twelve feet from the ground, was selected and the pair began building a nest. Notwithstanding the noise of the machinery and the continual passing up and down of the man in the derrick (the nest was built in the same corner as the ladder is located on the outside of) the nest was completed and three eggs deposited. Then something occurred that killed the female, and the male, after moping around for a day or two, also disappeared. That, I thought, was the end of that pair's nesting; but apparently not, as in a day or two the same male bird returned, bringing with him another mate. The outlook was again considered, and the pair began building another nest in the same location, resting the new nest on the top of the old one, building, as it were, a second story to it. After the new nest was completed, but before any eggs had been deposited, wondering what could have become of the eggs already laid, I went up the derrick, and, carefully raising the new structure, brought out the old eggs. Replacing the new nest as best I could, the birds continued to occupy it, and the female is now setting upon a full nest of eggs of her own laying, and I am now looking forward with considerable interest to the advent of a young brood to see how they will thrive under the circumstances.

I have asked several of my ornithological friends if such an occurrence has anywhere come under their observations, but have in all cases received a negative answer. WM. KENNEDY.

Austin, Texas, June, 1893.

The Tucumcari Fossils.

IN *Science*, May 26, pp. 282-283, there is an article by Mr. W. F. Cummins of the Texas Geological Survey, entitled "Geology of Tucumcari, New Mexico," in which he says: "Mr. Marcou . . . endeavors to avoid the conclusion (that the beds are Cretaceous) by saying that either the determinations of the fossils found by me were incorrect or that they did not come from that locality, and suggests that the labels on my packages were loosely put on and became mixed with collections made elsewhere; and on this flimsy subterfuge (to give it no harder name) still insists on the correctness of his reference to the Jurassic."

Mr. Cummins tells at length of the good care he took not to have any confusion of labels. So my suggestion cannot stand. I accept fully the explanation.

Now there remain two points, which are the most important: First, the correctness of the determination of the fossils; second, the stratigraphic position of the Jurassic strata of the Tucumcari between the Trias and the lower beds of the Neocomian, at Comet Creek, an affluent of Washita River, and at the great band of the Canadian River.

1. Mr. Cummins says: "myself and my assistants discussed the fossils in the field as we picked them up, and our note-books show that we then determined them as they are now designated." . . . "I made up small suits and sent them to various parties for determination, . . . and there was unanimous agreement as to all the species I have published." It is important to add an explanation as regards the species published. Only one species has been published by Mr. Cummins, a leaf of a fossil plant; all the invertebrate fossils are only quoted, without descriptions or figures. Here is the list given by Mr. Cummins:—

"*Gryphoa dilatata*, var. *Tucumcarii* Marcou; *Ostrea marshii*, as determined by Marcou, but in reality *Ostrea subovata*, Shumard; *Gryphoa pitcheri*, Morton; *Exogyra texana*, Romer; *Ostrea quadruplicata*, Shumard; *Trigonia emoryi*, Con.; *Cardium hillanum*, Sow.; *Cytheria leonensis*, Con.; and a single leaf of a dycotyledonous plant, which I described and figured under the name